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46-53, 3 Dec 53)

16th Part of No. AAEE/871

CONFIDENTIAL

MINISTRY OF SUPPLY

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT

BOSCOMBE DOWN

CLASSIFICATION CHANGED
TO CONFIDENTIAL
AUTH By Exec. Order 10501
BY R.C. Sutton
DATE MAY 12 1954

GANNET A.S. MK.1 - TEST FUSELAGE

HOOD JETTISON TESTS IN THE BLOWER TUNNEL

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54AA-15742

AAEE FORM 1. 10/51 (A1068) Wt.8856/1527. 32M. 2. 5/52. H. E. & S. Gp.848

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16th Part of Report No. AAEE/871

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT
BOSCOMBE DOWN

10. DEC. 1953

Gannet A.S. Mk.1 - Test Fuselage

Hood Jettison Tests in the Blower Tunnel

A. & A.E.E. Ref.: AAEE/6225/T/24/EGW

Period of Test : 31/10/52 - 3/11/52
9/12/52 - 30/12/52

Progress of issue of Report

Report No.		Title
11th Part of AAEE/871	VR.546	Handling Trials of a Prototype nearly Representative of the Production Aircraft: Lateral and Directional Characteristics.
12th - do -	VR.546	Handling Trials of a Prototype nearly Representative of the Production Aircraft: Longitudinal Characteristics, Stalls.
13th - do -	VR.546	Handling Trials of a Prototype nearly Representative of the Production Aircraft: with Cockpit Canopies Removed and also with two External Depth Charges.
14th - do -	VR.546	Longitudinal Stability Measurements of a Prototype nearly Representative of the Production Aircraft.
15th - do -	VR.557	Clearance of Prototype Armament Equipment Designed for Gannet AS Mk.1 and of Certain Other Stores.

Summary

A large number of hood jettison tests have been carried out on the Gannet AS Mk.1 Test Fuselage in the Blower Tunnel.

In the early tests, the hoods failed to release from their hinges until they had pitched through too great an angle, causing them to strike the airframe. As a result of modification the jettison characteristics were improved and all three hoods should jettison satisfactorily in flight at 240 knots. At 115 knots there is a slight danger of the rear hood hitting the fin. The other two hoods are satisfactory at 115 knots. All the hoods pitch very rapidly after release and, if this pitching could be reduced, very much better jettisons could be expected. Flight jettison tests on the middle hood are recommended. Further brief jettison tests, in the blower tunnel, are recommended to ascertain the effect of the aerial wire on the rear two hoods.

This report is issued with the authority of

Air Commodore,
Commanding, A. & A.E.E.,

/Introduction.....

1. Introduction

Tests were required to assess the jettison characteristics of the three hoods fitted to the Gannet A.S. Mk.1, and the possibility of injury to the crew or damage to the aircraft in the event of emergency jettisons being made in flight.

All tests were carried out using the structural test fuselage which had been suitably modified to make the hood jettison system and layout representative of a production aircraft. Fig. 1 shows the fuselage prepared for tests in the Blower Tunnel.

2. Description of the hoods and jettison mechanisms

2.1. All three hoods were of broad 'U' section constructed of a single skin of transparent material with metal edges. They varied slightly in shape and size but all weighed approximately 45 lbs. (including rails). They moved fore and aft on rollers located in the rails which were attached to the top decking of the fuselage. The No.1 (Pilots) hood was normally opened and closed by means of a hydraulic jack but this was not fitted for these tests. The other two hoods were opened and closed manually and held in either position by locking pins.

2.2. Each hood rail was located on the fuselage at the forward end by a hook which engaged with a pin on the underside of the rail. The rear end of each rail was held in position by the hinge fitting.

2.3. Operation of the jettison handle caused the hooks to disengage and the front end of the rails were lifted by the action of jettison assister springs. The hood and rails pitched through an angle of 15° before the rear hinges disengaged, and were then free to lift away from the fuselage.

2.4. Figs. 2, 3 and 4 show details of the three hood mechanisms as fitted to the test fuselage.

2.5. After test 3 the rail hinges were modified to ensure that they could disengage after the hood had pitched through 15°, even if there was no load acting forwards in the rails, as might result from centrifugal loads.

3. Conditions and results of tests

3.1. The fuselage was placed in front of the Blower Tunnel in the flight attitude for the test airspeed. The tunnel was set level and was raised and lowered as required to give a good airflow over and around the hood being tested. The fuselage was moved as required when carrying out tests in which yaw was being applied. The 6 ft. diameter nozzle was fitted to the tunnel for all tests.

3.2. All tests were recorded photographically from the beam and upper frontal positions. The beam view record incorporated a spark time base and an indication of the exact instant of the jettison handle being pulled.

3.3. Rescue slings were fitted to the hoods for all tests to enable them to be used for more than one test.

3.4. The aerial mast was not fitted for any of the tests due to the danger of smashing the pilots hood. It was not considered that the aerial wire would have any appreciable effect on the flight path of the hoods, but it would have been tested if there had been any hoods left at the end of the trial.

3.5. Details of the tests carried out and the results obtained are given in Appendix A.

/3.6.....

3.6. On a number of tests, both at 115 and 240 knots, the hood skins developed small cracks, which seemed to radiate from the corners, but this is not considered a hazard.

3.7. Figs. 5 to 22 show the hoods as they started to lift, being freed from the hinges and subsequent positions in flight and the time taken to assume these positions from the instant of pulling the jettison handles.

3.8. Attempts were made to move the C.G. of the hoods forward by the addition of lead weights at the front end of the rails. A maximum of 7 lbs. was added and this gave no improvement in jettison characteristics.

3.9. The pressures within the cockpits were measured at both 115 knots and 240 knots, with hoods fitted, and the following changes from static were recorded:-

Speed	No. 1 (Pilots)	No. 2 (Obs.)	No. 3 (Aircrew)
115 knots	+ .050 p.s.i.	Zero	Zero
240 knots	+ .125 p.s.i.	Zero	Zero

4. Criticisms of the jettison mechanism

4.1. The hinges as fitted to the fuselage for tests 1 to 3 failed to release until the hoods had pitched through too great an angle. This was due to the fact that an end load in the rail in the rearward direction was required to effect a satisfactory release. The modified hinges as fitted for tests 4 to 19 allowed the rails to disengage after the hood had pitched through 15°, no end load being required.

4.2. The jettison mechanisms were very simple, easy to maintain and re-set, and no difficulties were experienced during any of the tests carried out.

5. Conclusions

Provided that the new type hinges are fitted, the following conclusions are made:-

5.1. All three hoods are likely to jettison satisfactorily in flight at 240 knots.

5.2. At 115 knots (1.2 V_S) there is a slight danger of the rear hood hitting the fin. The other two hoods are satisfactory at 115 knots.

5.3. The hoods pitch very rapidly after release, probably due to a combination of aerodynamic and dynamic characteristics. If this pitching could be reduced, very much better jettisons could be expected. Moving the C.G. forward $1\frac{1}{4}$ inches seemed to have little or no effect.

5.4. The pilots hood would have fouled the existing length (20.7") aerial mast.

5.5. The absence of one or two hoods does not materially affect the jettison characteristics of the third hood.

5.6. The application of small angles of yaw does not materially effect the jettison characteristics.

6. Recommendations

6.1. The modified rail hinges should be fitted.

/6.2.....

6.2. Efforts should be made to reduce the angle through which the hoods pitch on being jettisoned, particularly the rear hood, to improve its jettison characteristics at low speed. In the meantime, the Service should be advised to jettison the rear hood at the highest possible speed, or alternatively to open it rather than jettison it at low speeds.

6.3. The top of the aerial mast should be swept back at least 3 inches and possibly more. Should a longer aerial mast be adopted, the sweepback will have to be considerably greater. The overall length of the aerial wire attachment fittings must be kept to a minimum to avoid contact with No. 2 hood when jettisoned.

6.4. Flight tests are recommended and it is suggested that they are confined to the middle hood. The rear hood should be removed for these tests which should be carried out at 240 knots without the application of yaw. The aerial wire should be removed.

6.5. Further brief jettison tests should be carried out, in the blower tunnel, with the aerial wire fitted.

Circulation List

A.D.R.D.N.	2 copies, 1 for Action
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/Appendix 'A'....

Gannet A.S. Mk.1

Test	Speed	Incidence	Yaw	Hood 1	Hood 2	Hood 3	Remarks	Fig. No.
1	115 knots	+7°	Zero	Fitted	Fitted	Jettison	Hood lifted at front and pitched through an angle of 43° before releasing from the hinges. It then continued to pitch over on to its back and struck the fuselage, at the point where the fin is normally attached, and broke up.	5
2	"	"	"	Fitted	Jettison	OFF	Hood pitched through 38° before releasing from its hinges. It continued to pitch while passing upwards and aft.	6
3	"	"	"	Jettison	OFF	OFF	After pitching through a considerable angle the starboard rail disengaged from its hinge and the port rail stayed in engagement. It then yawed to port and the port hinge disengaged and the hood lifted clear of the airframe and hit the top decking between Nos. 2 and 3 cockpits and broke up. The port hinge was found to be distorted after the test. No photographic record is available.	N/A
4	"	"	"	Fitted	Fitted	Jettison	Rail hinges modified. See Para. 2.5. Hood pitched through 24° before releasing from its hinges. It continued to pitch whilst moving upwards and aft.	7
5	"	"	"	Fitted	Jettison	OFF	Results very similar to Test 4 except that the hood climbed more steeply whilst moving aft.	8
6	"	"	"	Jettison	OFF	OFF	Results similar to Test 5.	9
7	"	"	"	Jettison	Fitted	Fitted	Results as Test 6.	10
8	"	"	"	Fitted	Jettison	Fitted	Results as Test 5.	11
9	"	"	"	Jettison	OFF	Fitted	Results as Test 6.	12
10	"	"	"	OFF	OFF	Jettison	Results identical to Test 4.	13
11	240 knots	$-\frac{3}{4}$°	"	Fitted	Fitted	Jettison	Hood lifted at the front and pitched through 26° before releasing from the hinges. It continued to pitch whilst climbing and moving aft.	14
12	"	"	"	Fitted	Jettison	OFF	Results very similar to Test 11.	15
13	"	"	"	Jettison	Off	OFF	" " " " " "	16

/14....

Test	Speed	Incidence	Yaw	Hood 1	Hood 2	Hood 3	Remarks	Fig. No.
14	115 knots	$+7^{c}$	10^{o} Port	Fitted	Fitted	Jettison	Results very similar to Test 11.	17
15	"	"	"	Fitted	Jettison	OFF	" " " " " "	18
16	"	"	"	Jettison	OFF	OFF	" " " " " "	19
17	240 knots	$-\frac{3^{o}}{4}$	Zero	Fitted	Jettison	Fitted	" " " " " "	20
18	"	"	5^{o} Port	Fitted	Fitted	Jettison	Results similar to Test 11 except that the hood rolled slightly whilst climbing.	21
19	"	"	"	Fitted	Jettison	OFF	" " " " " " " " " " " "	22

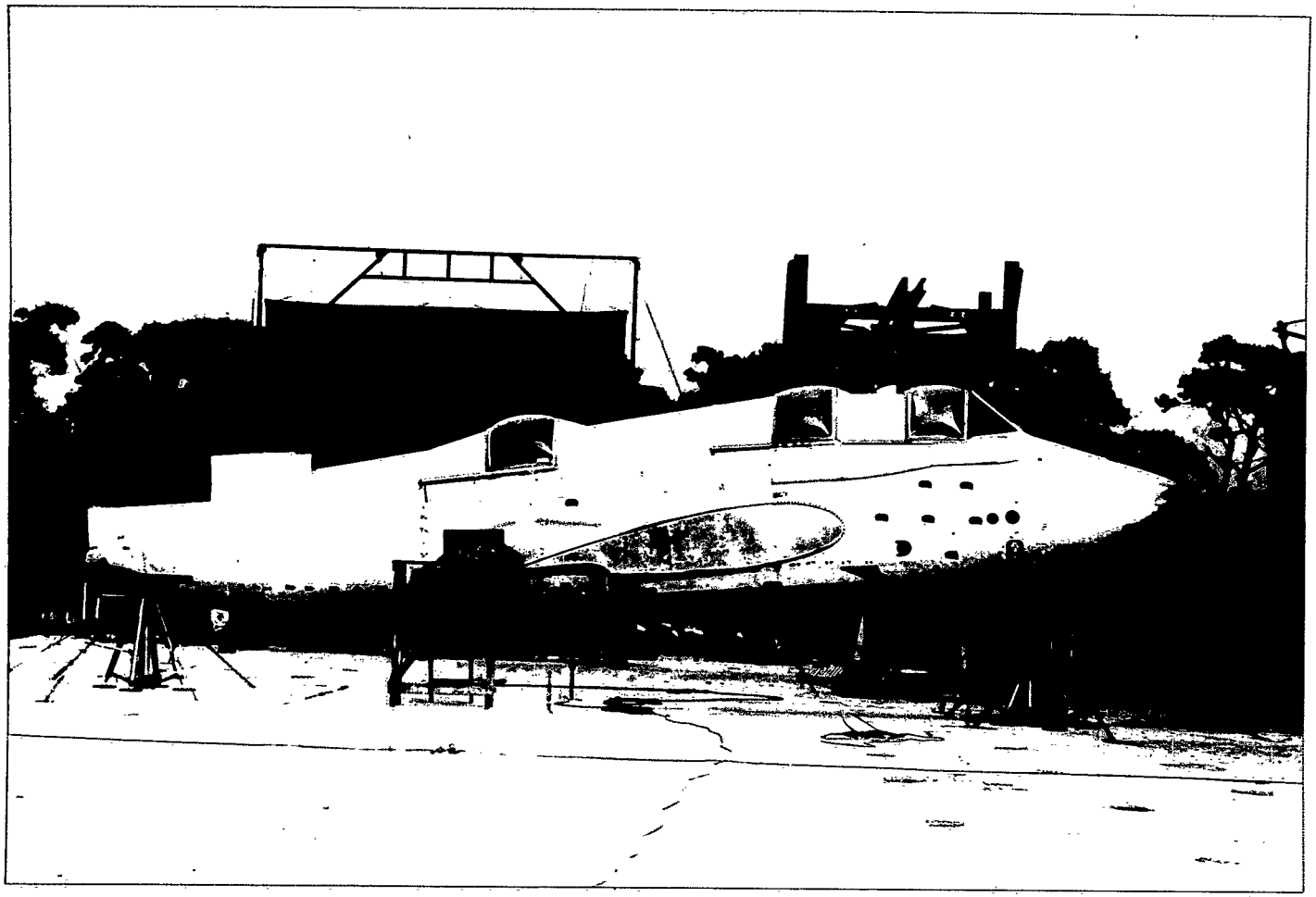


FIG.1.

GANNET A. S. Mk.1. HOOD JETTISON TESTS.

A.& A.E.E. NEG No. 15917.

SK No A.4542	16th PART OF REPORT NO A&A.E.E./ BTI	GANNET A.S. MK.I.	TR. K.M.	CH. E.G.WILSON.	APP. K.H.N. for SofE	3.11.53.

No.1 (PILOTS) HOOD.

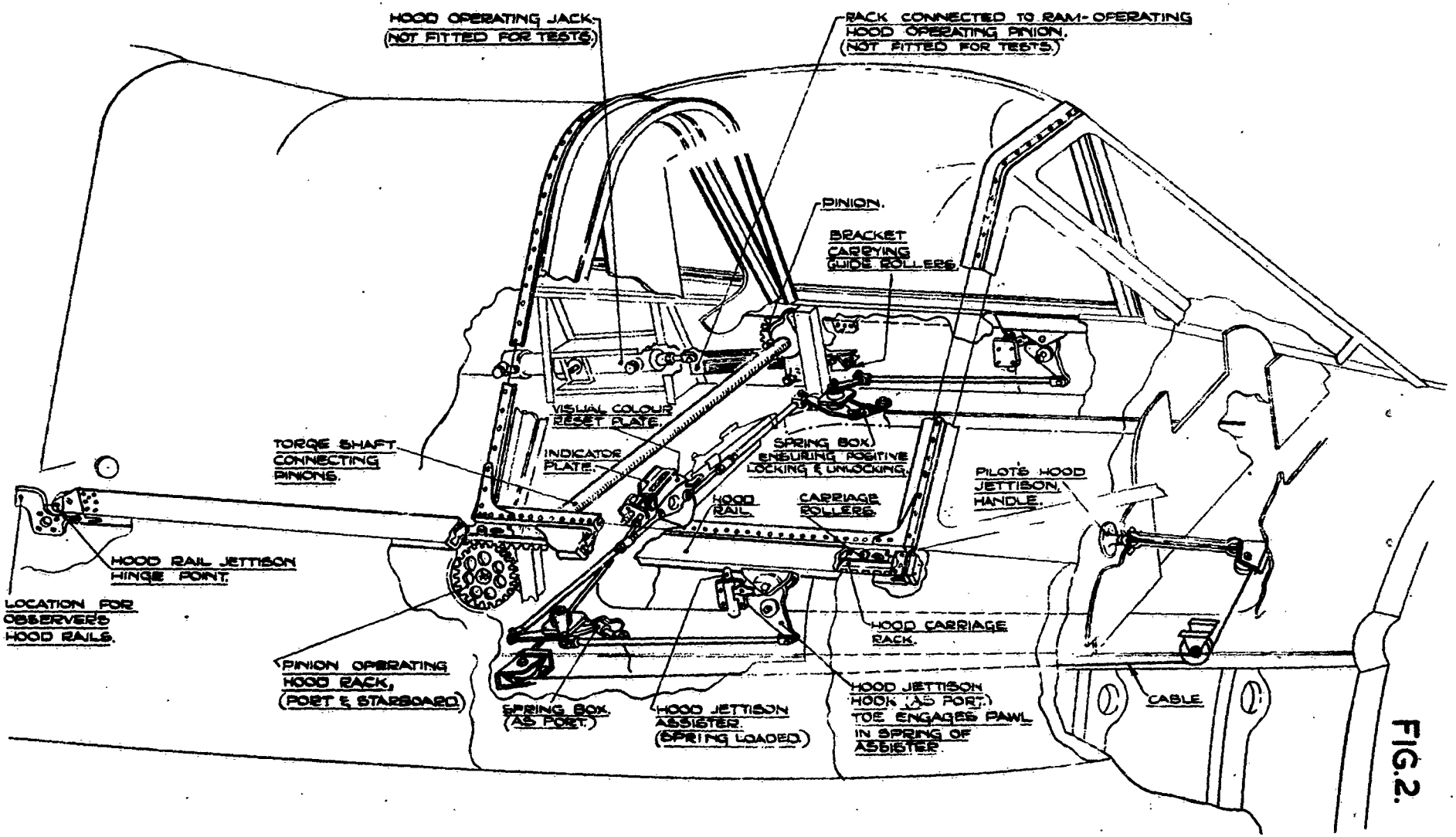


FIG.2.

SK.NºA.4543.	15TH PART OF REPORT NºA&A.E.E./ 871	GANNET A.S. MK.1.	TR.S.M.	CH, E.G. WILSON.	APP R.H.W. for SofE	2.11.53

Nº2 (OBSERVER'S) HOOD.

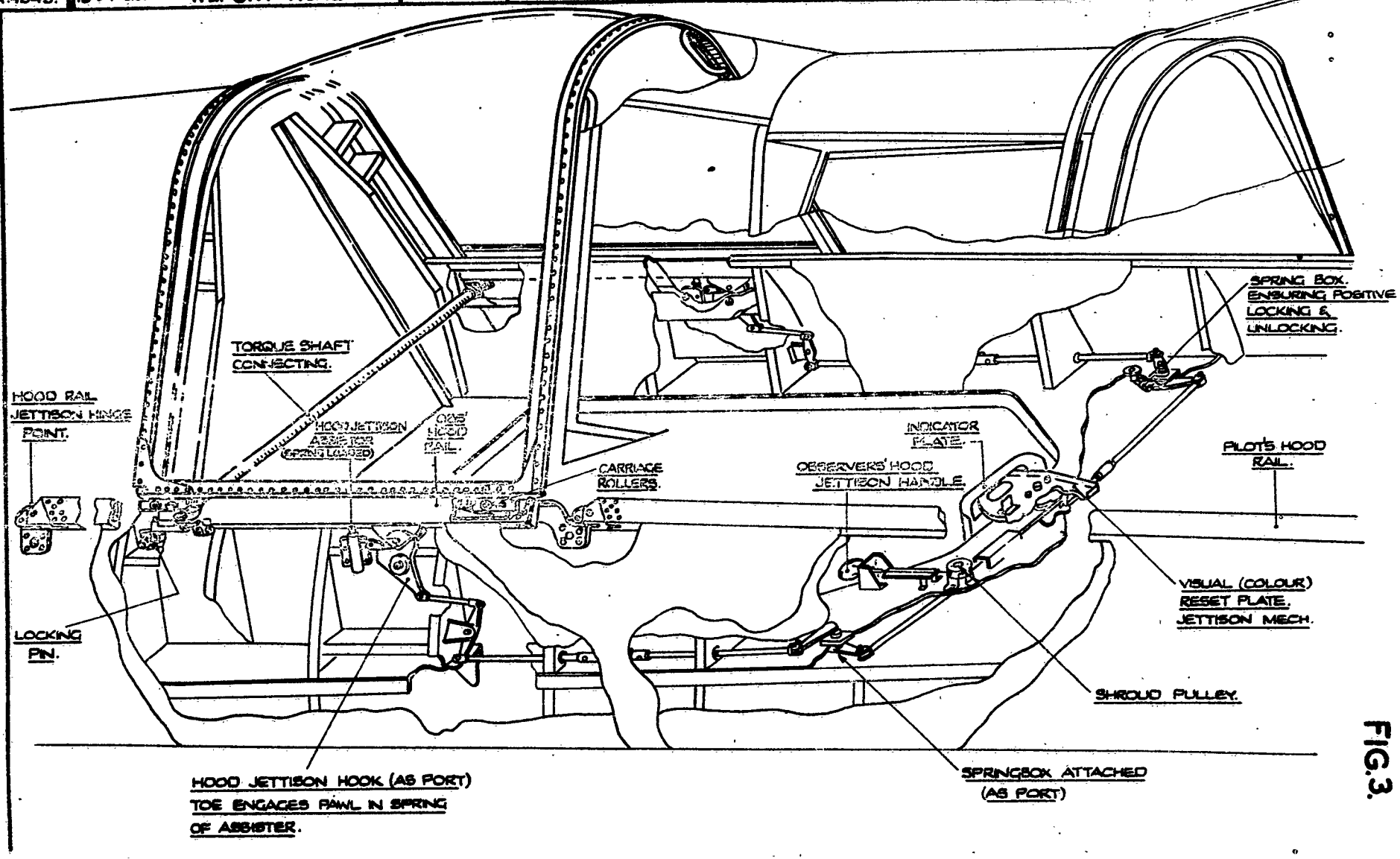
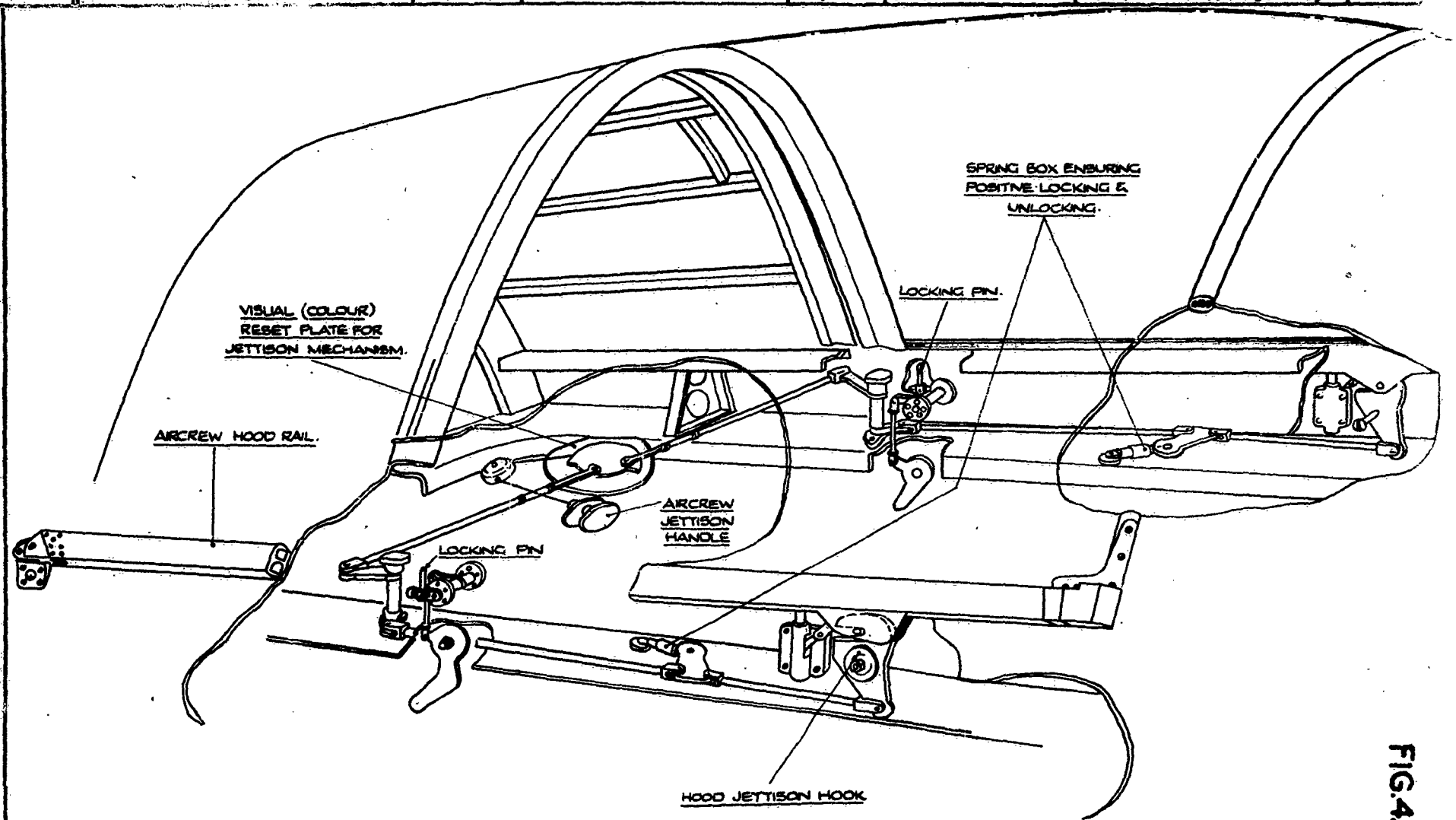


FIG.3.

SK.NºA.4544	16th PART OF REPORT NºA&A.E.E./871	GANNET A.S. MK.1.	TR. S.M.	CH. E.G. WILSON.	APP. R.W. for SofE	3.11.53.



Nº 3 (ARCREW) HOOD.

FIG.4.

FIG 5&6

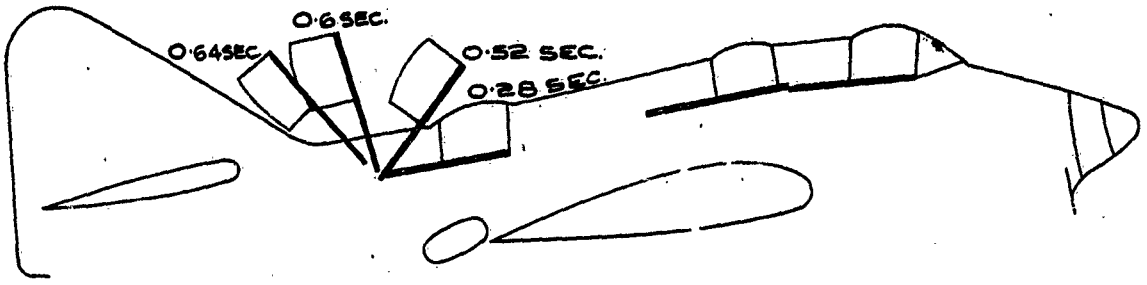


FIG. 5 TEST 1. 115 KTS. NO YAW.
DATUM ANGLE TO AIRFLOW +7°

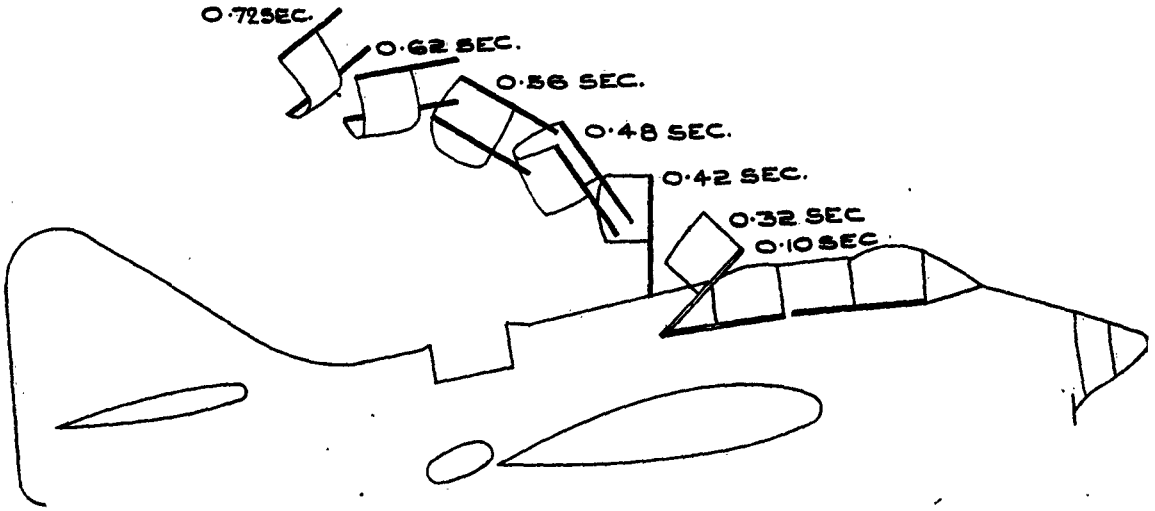


FIG. 6 TEST 2. 115 KTS. NO YAW.
DATUM ANGLE TO AIRFLOW +7°

SK. No A.4143. 16TH PART OF REPORT No A&A.E.E./871 | GANNET A.S. MK.1. | TR. S.M. | CH. M. JENNINGS. | APP | for SofE. 6.11.52.

HOOD JETTISON TESTS

FIG. 7 & 8

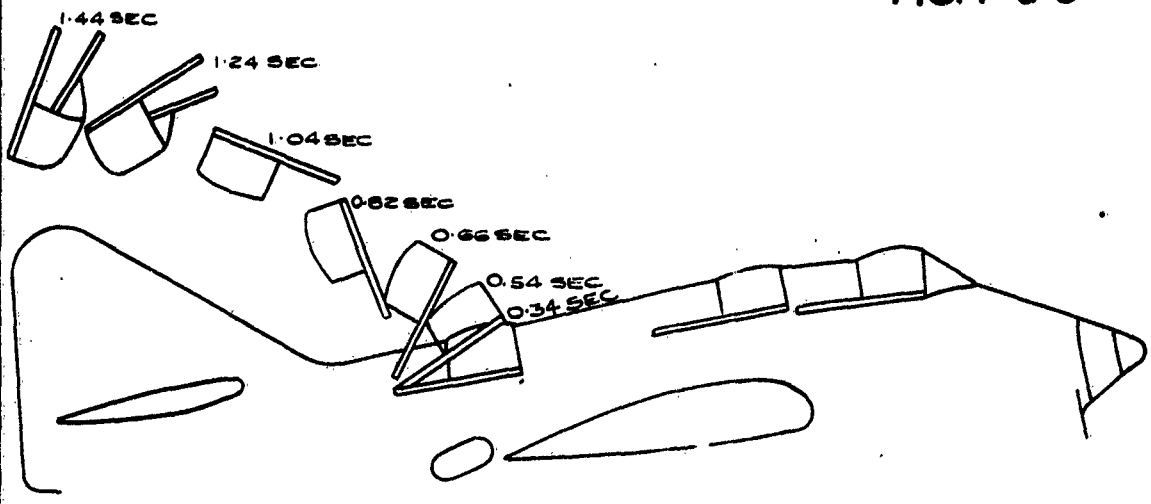


FIG 7. TEST 4 118 KTS. NO YAW

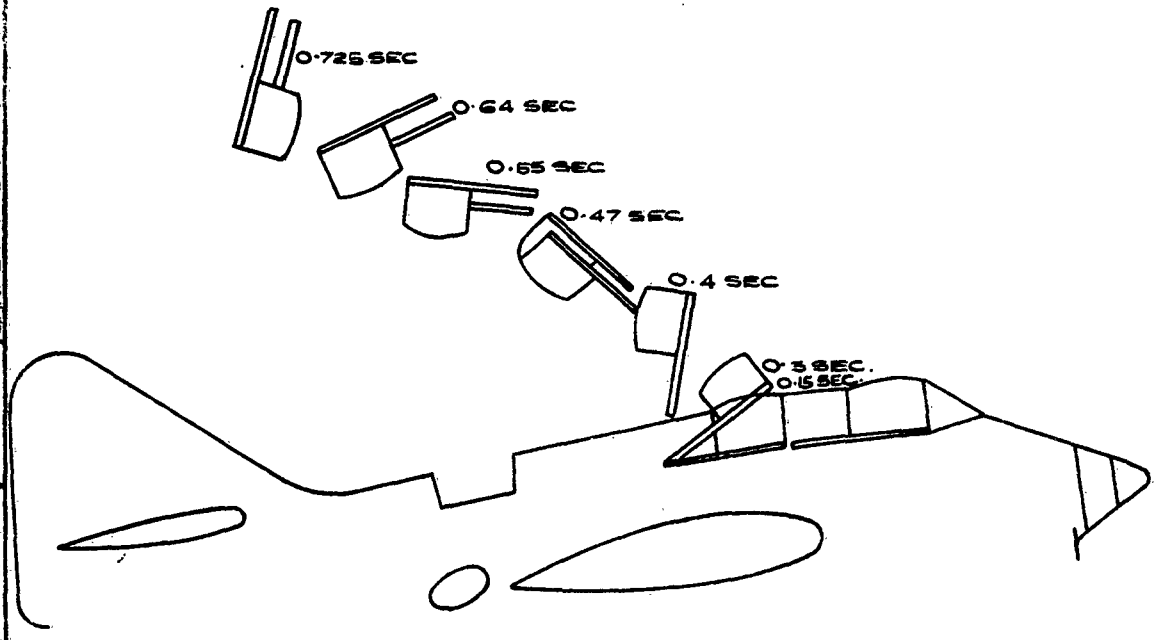


FIG. 8 .TEST 5. 115 KTS. NO YAW.

SK. No A4344 | 16TH PART OF REPORT No A&A.E.E./871 | GANNET A.S. MK.1. | TR. D.L. | CH. M. JENNINGS. | APP A.M. for-Sof E | 29.1.5

HOOD JETTISON TESTS.

SK. No. A4345 | 16th PART OF REPORT No. A&A.E.E./871 | GANNET A.S. MK. I. | TR. M. of A. CH, M. JENNINGS. | APP | "W." for Sofe | 24.1.43

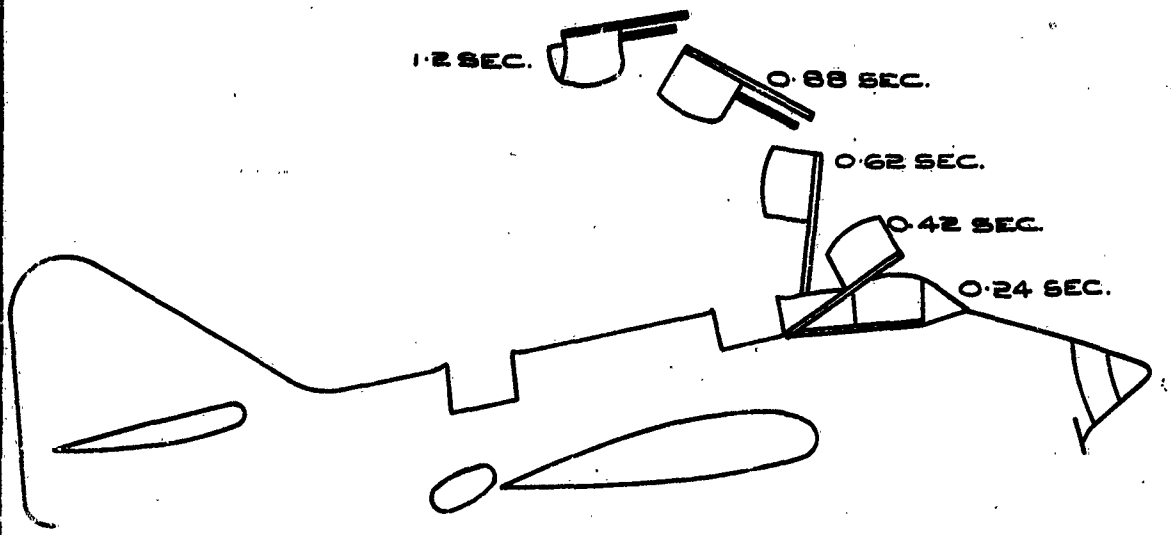


FIG. 9 TEST 6 115 KTS. NO YAW.

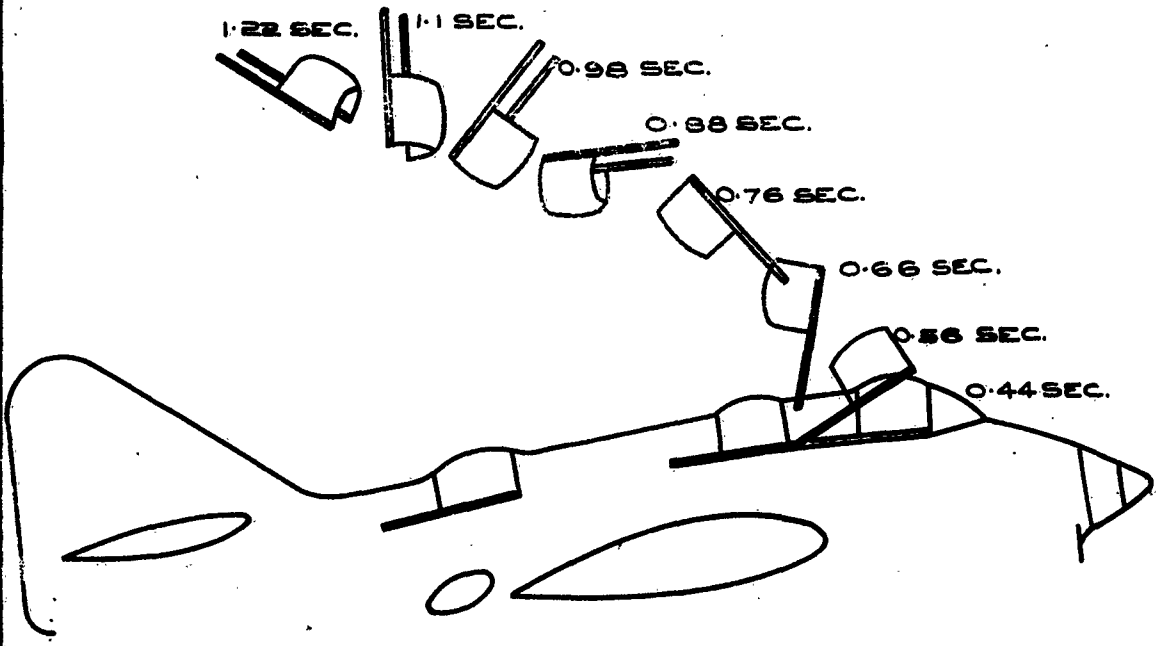


FIG. 10 TEST 7 115 KTS. NO YAW.

HOOD JETTISON TESTS.

FIGS. 11 & 12

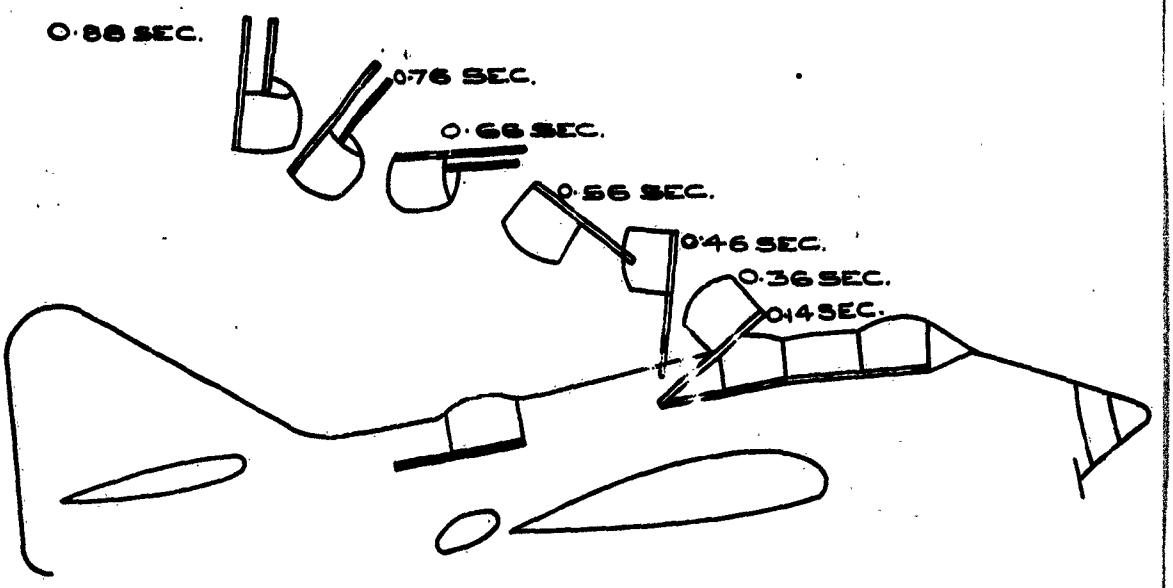


FIG. 11 TEST 8 115 KTS NO YAW

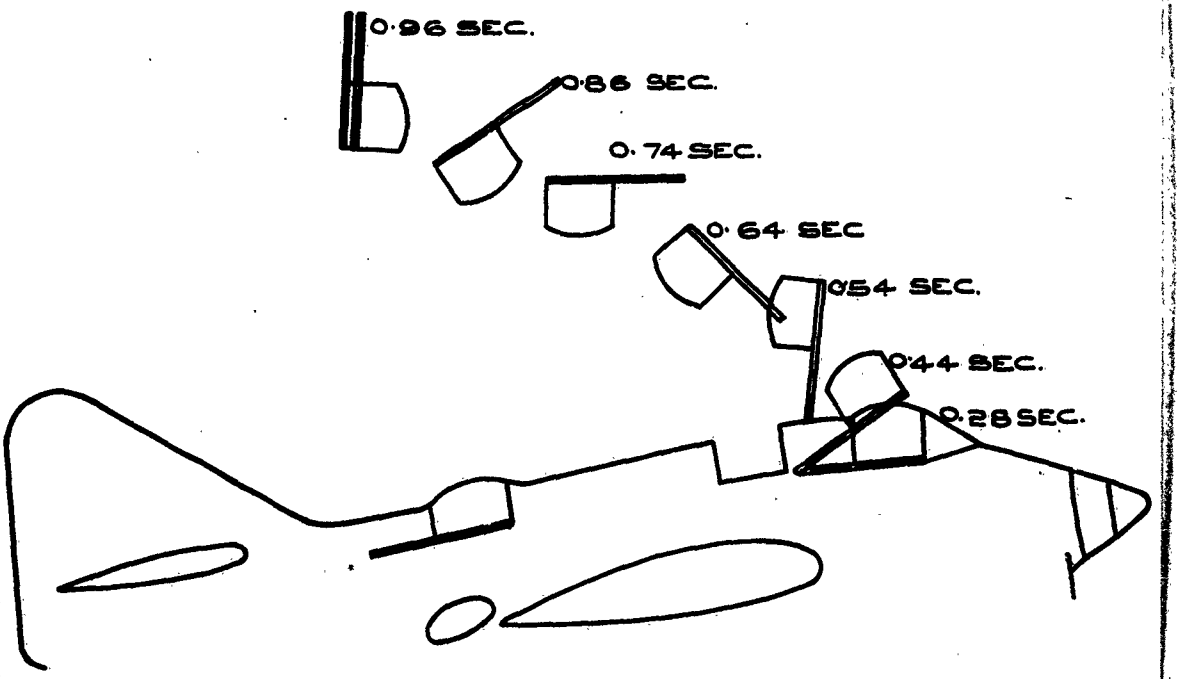


FIG. 12 TEST 9 115 KTS NO YAW.

HOOD JETTISON TESTS.

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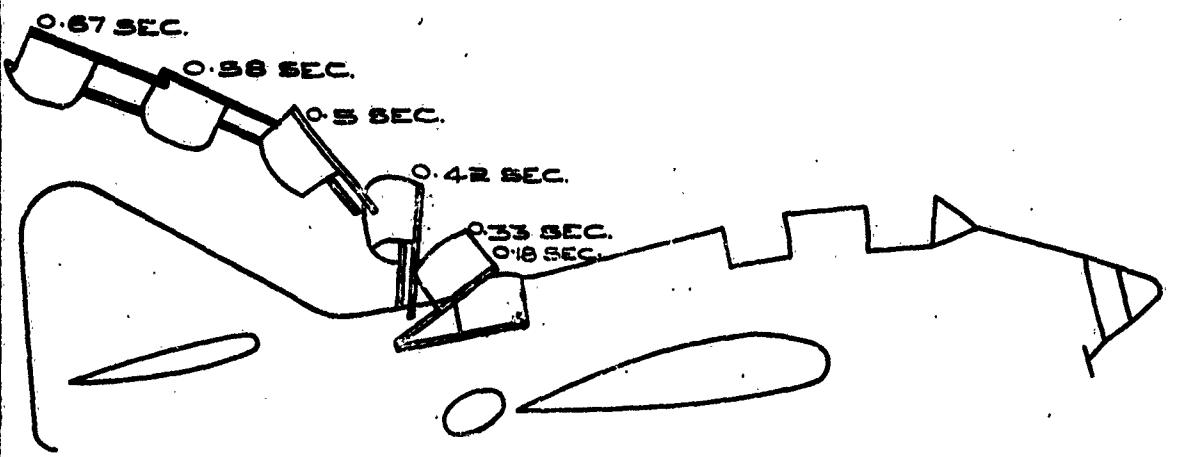

FIG. 13 TEST 10 115 KTS. NO YAW.

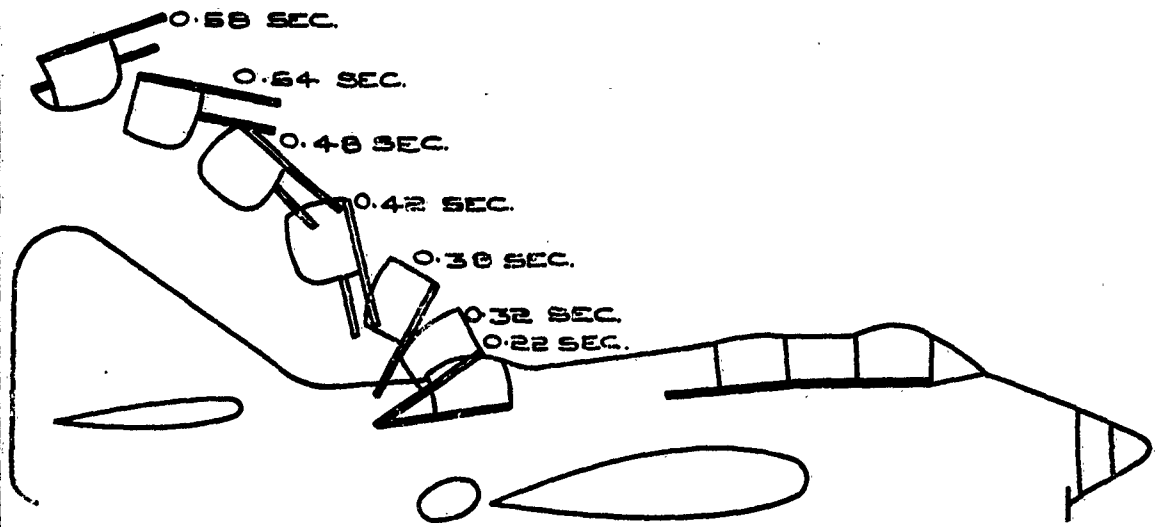

FIG. 14 TEST 11 240 KTS. NO YAW.

HOOD JETTISON TESTS.

FIGS. 15 & 16

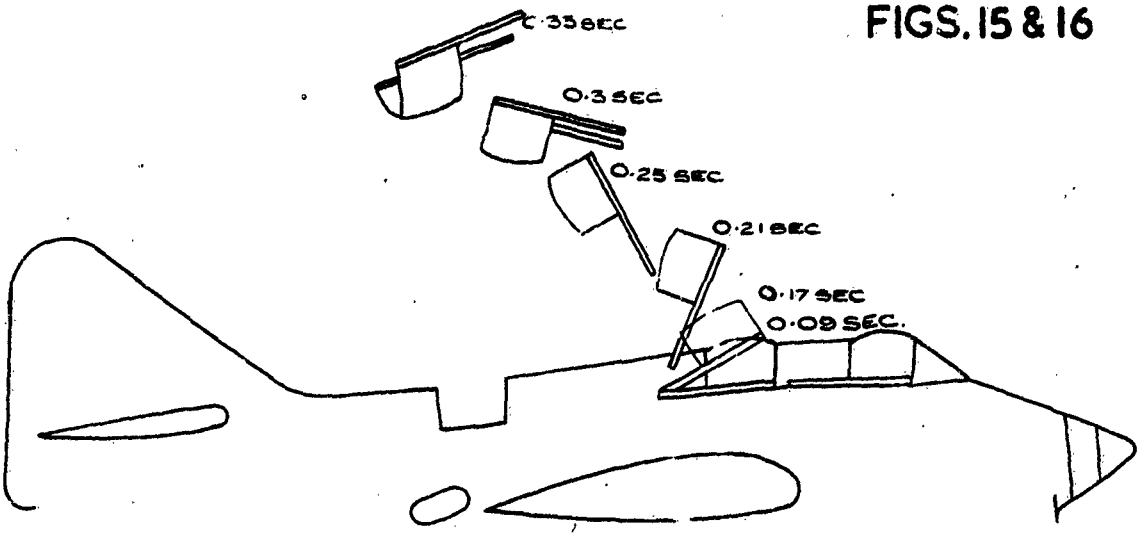

FIG. 15 TEST 12. 240 KTS. NO YAW.

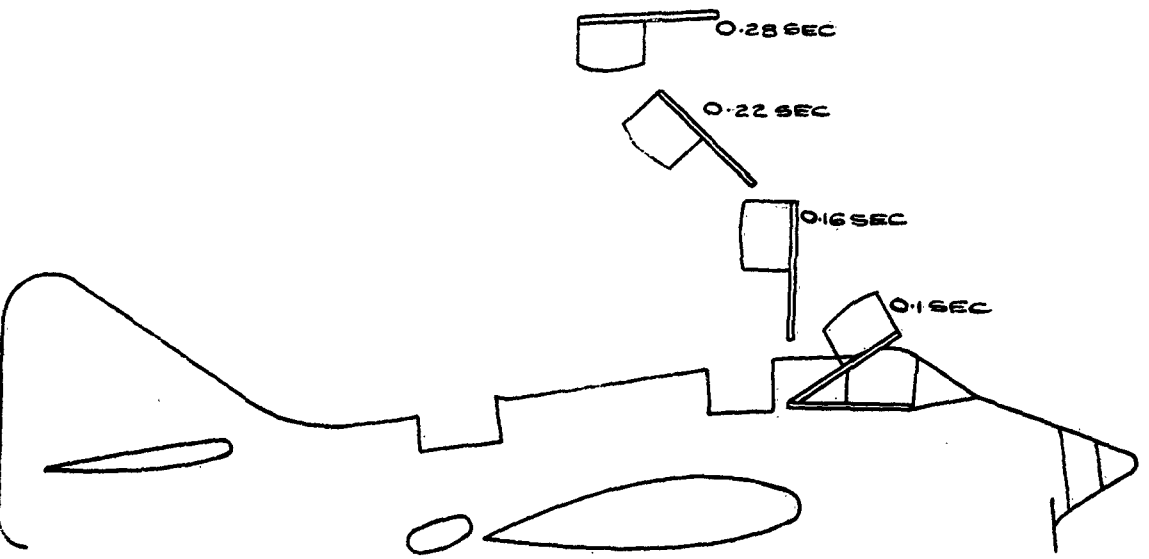

FIG. 16. TEST 13. 240 KTS. NO YAW.
(TIMES TAKEN FROM INITIAL MOVEMENT OF HOOD)

SK. No A. 4348 | 16TH PART OF REPORT No A&A.E.E./871 | GANNET. A.S. MK. 1. | TR. D.L. | CH. M. JENNINGS. | APP | for Sof E | 22.1.53.

HOOD JETTISON TESTS.

FIGS. 17 & 18

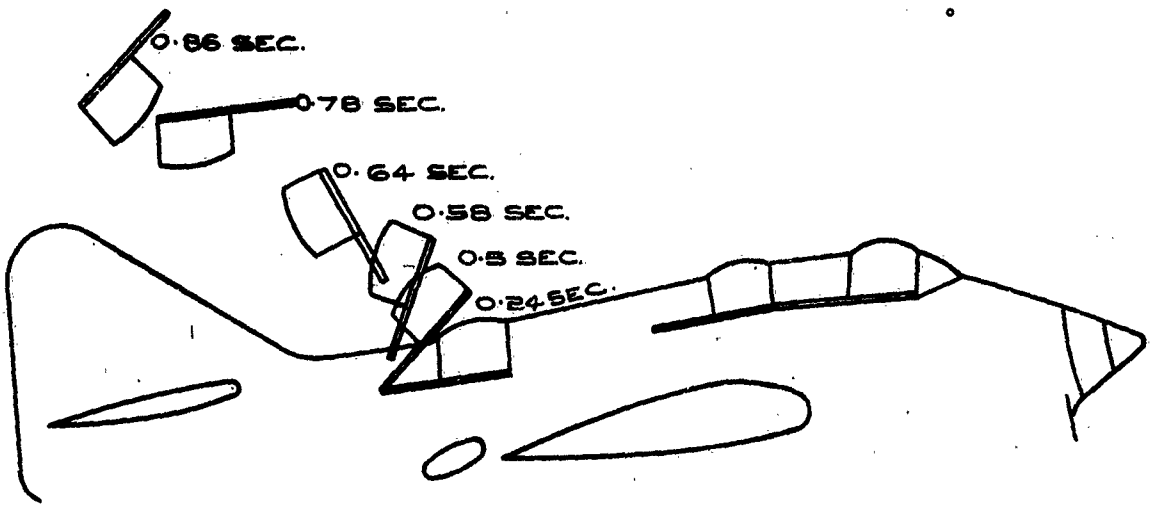

FIG. 17 TEST 14 115 KTS. 10° YAW TO PORT.

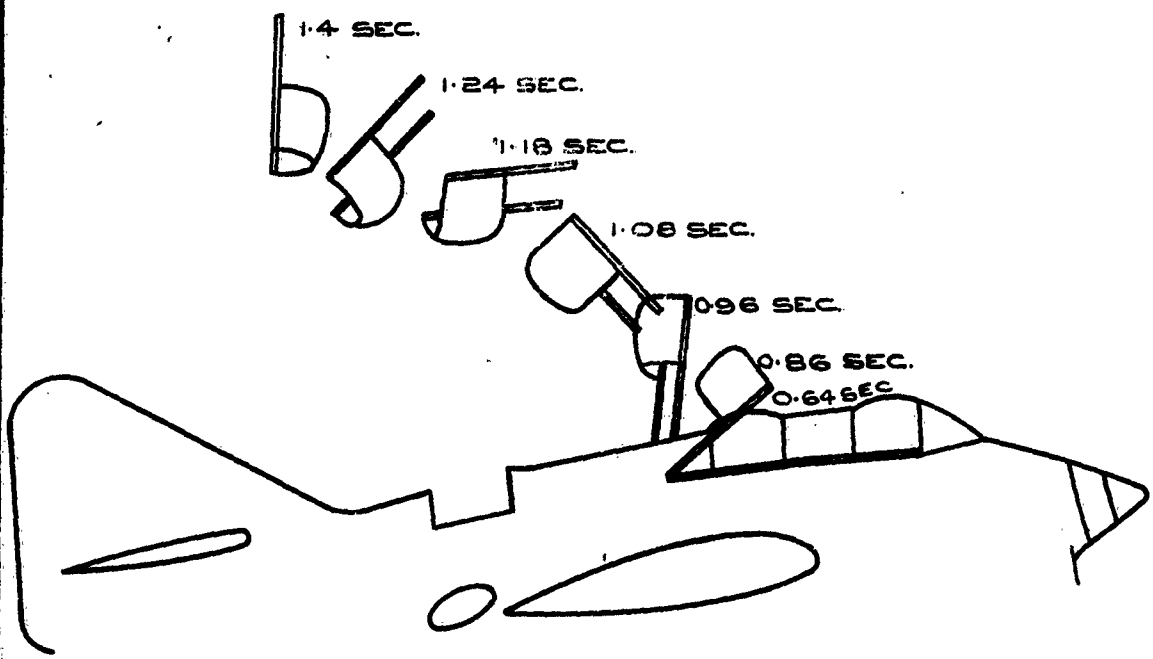

FIG. 18 TEST 15 115 KTS. 10° YAW TO PORT.

HOOD JETTISON TESTS.

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FIGS. 19 & 20

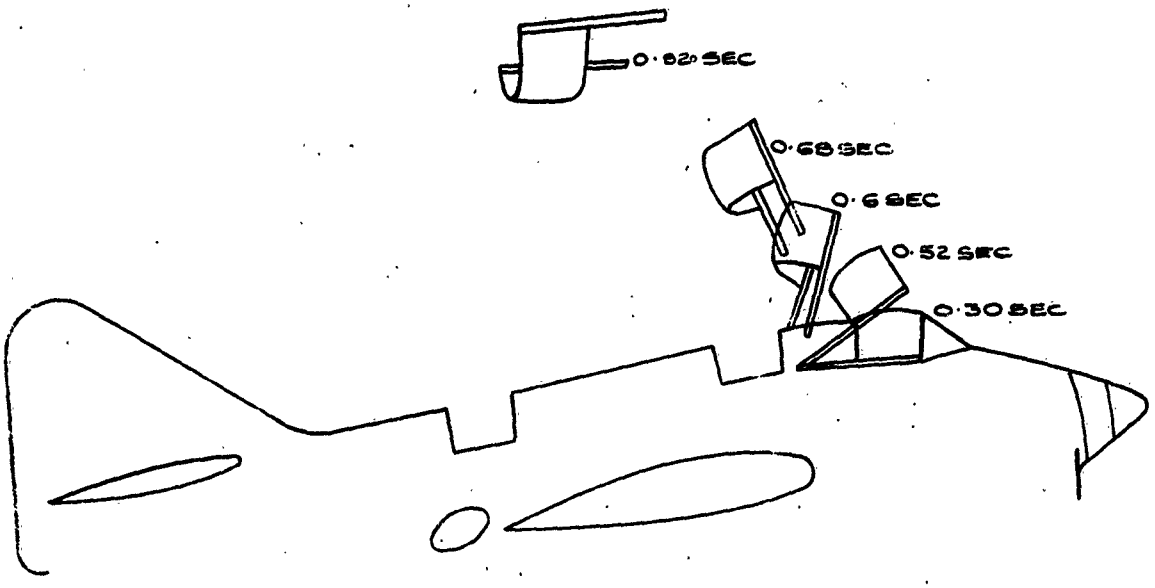

FIG. 19 TEST 16. 115 KTS. 10° PORT.

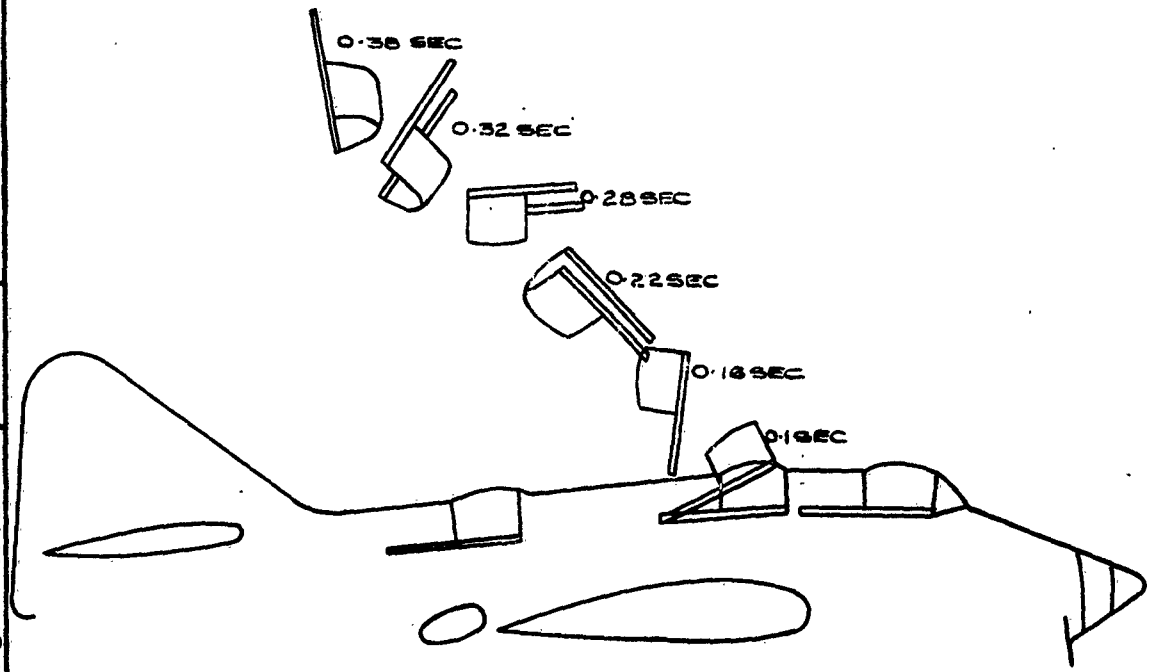

FIG. 20 TEST 17 240 KTS. NO YAW.
(TIMES INDICATED ARE FROM INITIAL MOVEMENT OF HOOD).

SK. No. A.4350 | 16th PLET OF REPORT No. A&A.E.E./ 871 | GANNET A.S. MK. 1. | TR. D.L. | CH. M. JENNINGS. | APP | for SofE | 19.1.53

HOOD JETTISON TESTS.

SK.N9A/351 | 16TH PART OF REPORT N9A&A.E.E./871 | GANNET A.S. MK.1 | TR. M.O.? | CH. M. JENNINGS. | APP | for S of E | 13.1.53

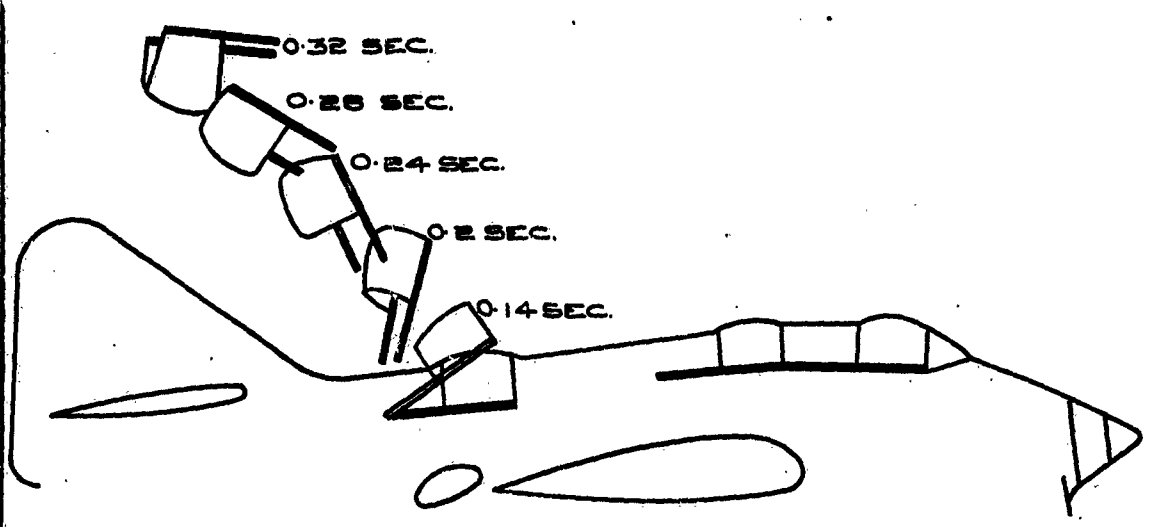

FIG. 21 TEST 18 240 KTS. 5° YAW TO PORT.
(TIMES INDICATED ARE FROM INITIAL MOVEMENT OF HOOD).

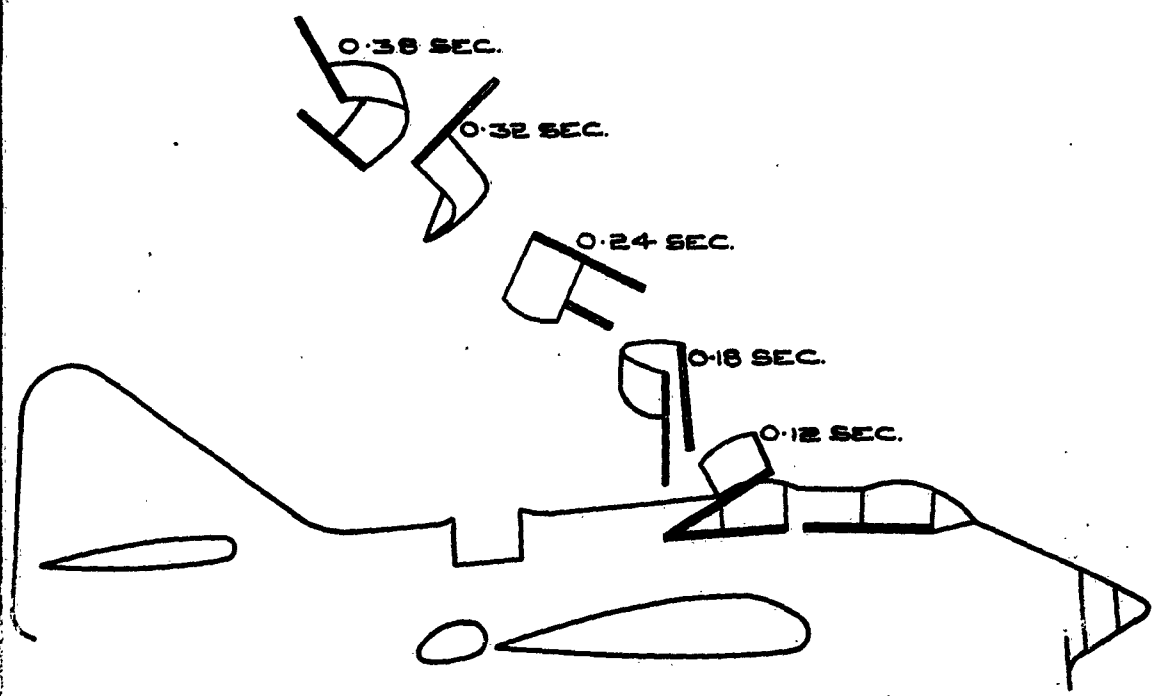

FIG. 22 TEST 19 240 KTS. 5° YAW TO PORT.
(TIMES INDICATED ARE FROM INITIAL MOVEMENT OF HOOD).

HOOD JETTISON TESTS.

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Date of Search: 30 July 2008

Record Summary: AVIA 18/4112
Title: Gannet AS Mk 1: test fuselage: hood jettison tests in the Blower Tunnels
Availability Open Document, Open Description, Normal Closure before FOI Act: 30 years
Former reference (Department) 871 Pt 16
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